cumstances it is natural that monographers should have expressed diverse opinions as to the limits of the species, and that different characters and parts of the plant should have been taken as a basis for classification. Bentham grouped the species according to the shape and mode of dehiscence of the anthers, and von Mueller followed his lead. Prof. Tate has proposed a system based upon the structure of the fruit, whilst of vegetative characters, the cotyledons, leaf-veins, stomata, gums, and timber have all been tested in the hope of finding satisfactory criteria. Mr. Maiden attaches considerable importance to the bark and timber for the guidance of the forester, but recognises that the anthers and fruit are the best characters for the systematist.

In the present monograph the object of the author has been to include, with a description of the important characters, the substance of all recorded observations and investigations which might assist in determining the position and value of species or varieties. Synonyms are considered in detail, with the original description of each where it has been proposed as a species, and the range of each species is noted; finally, the author's views are crystallised in a discussion of the affinities of allied species. These views are based not only on the examination of specimens from important herbaria, but also upon much careful study of the growing trees in their native localities. Whilst recognising the desire of the author to render the work as comprehensive as possible, it must be said that its practical value would be increased by a considerable reduction in the amount of material, in the size of print and in the spacing. The five parts issued amount to 145 pages, and contain twenty-four plates for eight species, so that the complete work will be bulky and exclusive as to price. It may be suggested that a supplement to this treatise in the shape of a compendium suitable for foresters and students generally would be most useful.

Hymenopteren-Studien. By W. A. Schulz. Pp. 147. (Leipzig: Engelmann; London: Williams and Norgate, 1905.) Price 4*s*. net.

The present work consists of three essays, the first relating to African Hymenoptera (chiefly Vespidæ and Fossores), the second describing new genera and species of Trigonalidæ, and the third discussing Vespidæ and Apidæ from the Amazons. The work is chiefly descriptive, and will hardly appeal to any but specialists, who must of course consult it when working at the faunas and groups which are discussed in it.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* Nature. *No notice is taken of anonymous communications.*]

The High-frequency Electrical Treatment.

The inquest on a lady who died in the Charing Cross Hospital on April 11 must be of interest to those who employ the high-frequency electrical treatment. The report of the case in the *Standard* of April 17 is as follows:—"On April 11 she (the deceased) was under treatment, lying on the electrical couch. Suddenly witness observed the perspiration break out on her face, and immediately stopped the current. He watched her for a while, and as she seemed to be in a collapsed state he administered a spoonful of sal volatile. Then he recognised symptoms which pointed to 'a serious state of affairs,' and sent for Dr. Bailey. The lady was removed to another ward and died in the evening. Death was caused by hemorrhage of the brain, following a rupture of an artery. This was not a consequence of the electrical treatment; she would probably have died just the same if she had been sitting in the waiting-room, instead of on the electrical couch. It was a mere coincidence. Dr. Bailey and Dr. Freyberger gave evidence supporting this view of the case." The treatment was that of the high-frequency electrical current.

Now that high-frequency electrical discharges are much employed in medical work, being the newest and most up-to-date method of treatment for many diseases, it is somewhat important that even "mere coincidences," such as that cited, should not be overlooked or treated lightly; it is only by collecting evidence on such points that any real knowledge respecting the action of the treatment can be obtained. Shortly after the experiments of N. Tesla on electrical discharges, I carried on many experiments on the subject, and from somewhat painful experience I have learned that one source of trouble may be overlooked by many, since it is a secondary action, so that while the utmost attention may be given to the behaviour of the discharge itself, but little may be given to the action of the air which has been subjected to an electrical discharge. The danger of breathing such air was pointed out by me long ago (Nature, 1896), and by many other workers with electrical discharges since then. Air which had been acted on by the high-frequency discharge, when breathed, caused irritation to the throat and lungs, and a feeling of suffocation, in some cases very severe. This is rather to be expected, since ozone and ozonised air act on blood, albumen, and organic substances readily. Profs. Roscoe and Schorlemmer write thus in their treatise on "Chemistry," p. 243, vol. i. (subject, ozone):—"Whilst blood is completely decolorised, the albumen being entirely, and the other organic matters being nearly all destroyed.")

The trouble mentioned was removed to a considerable extent by inducing a strong draught of warm air across the chamber where the apparatus was used. I feel that I am taking a great liberty in suggesting anything to the high-frequency specialist, who will give me at once the reason why self-induction is expressed as "a length," and why a rapidly varying electromagnetic field causes flashes of light to be seen when the head is placed in such a field. I would suggest that in connection with the method of treatment with the high-frequency discharge, all evidence of new phenomena should be collected and sifted in a scientific spirit, whether it be for or against it.

Operators now take every possible precaution to guard themselves against the evil effects of the X-ray, which at first was treated as quite innocuous. May not the high-frequency discharge in a modified form have a somewhat similar kind of action, and should it not be treated with as much, or at least some, caution?

F. J. Jervis-Smith.

The Critical Temperature and Pressure of Living Substances.

It is well known that living substance is in a labile state, its constructive or destructive metabolism being determined by minute changes, sometimes of temperature or pressure, sometimes of other dynamic conditions. But Mr. Geoffrey Martin's suggestion (Nature, April 27, p. 609) that the lability is due to the great number of atoms in the molecules of living substance, or to the complex "carbon compounds" present, gives only a partial explanation.

The decomposition of a chemical compound under raised temperature, diminished pressure, &c., depends not only on the size and complexity of the molecules, but also on the tendency of the atoms to re-arrange themselves and form more stable compounds, generally with dissipation of energy. For instance, the paraffins with large molecules are fairly stable, the products of their decomposition being hydrocarbons still. Fatty acids with equally large molecules are less stable, for there is a tendency to split off substances of higher oxidation, leaving a hydrocarbon residue. This tendency increases with the increase of oxygen in compounds, and so the small molecule of glucose is less stable than the large molecule of fatty acid. The presence of nitrogen is often a cause of instability, especially when the nitrogen forms a link between elements (or groups) of opposite polarity; and the instability is most marked when the nitrogen is combined with oxygen on the

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one hand, and with carbon and hydrogen on the other, as in the explosives, *e.g.* nitroglycerine.

Living substance has apparently all the above mentioned sources of instability, and perhaps not the least important is that it has for its pivot nitrogen, the element which above all others is remarkable for the lability of its compounds. I have elsewhere[1] indicated the probability that the active molecule of living substance consists of an enormous complex of proteids, carbohydrates, &c., linked together by means of the nitrogen atoms, and that the oxygen store is more or less combined with the nitrogen. At the death of the molecule its constituent groups (proteids, &c.) are released, and the store of oxygen passes from the nitrogen into other and more stable forms of combination.

F. J. Allen.

Cambridge.

Chalk Masses in the Cliffs near Cromer.

At the present time the cliffs near Cromer exhibit some interesting chalk masses in the Glacial drifts. Between East and West Runton Gaps are several of great size and remarkable in position. One, a very long slab-like mass, is bent from being nearly horizontal until it is almost vertical, and thus comes to within a short distance of the top of the cliff. The masses near Trimingham will now repay a close study, for they have changed greatly during the last five years. Both my friend, the Rev. E. Hill, and I have made notes and rough sketches, with the intention of sending to the *Geological Magazine* a short account of what can now be seen; but we earnestly hope that some geologists who are adepts at photography will visit both localities at the earliest possible opportunity, in order to secure a permanent and accurate record of these exceptionally interesting sections.

T. G. Bonney.

The Rigidity of the Earth's Interior.

The letter of Dr. T. J. J. See (Nature, April 13, p. 559) deals with a subject of profound interest to students of the larger problems connected with physical geology. But it appears that, in Dr. See's treatment of the subject, he has overlooked an important point, which I dealt with in a paper read before Section C of the British Association at Birmingham in 1886. Therein I directed attention to the fact that "gravitation" is only a special instance of the law of universal attraction, and as a corollary to this, at any considerable depth within the sphere of the earth, an appreciable factor of what I may call negative gravity must be allowed for, owing to the counter-attraction of the mass of matter situated nearer the surface of the sphere; so that a body placed at the centre of gravity of the earth, whatever its mass or density, would have no weight at all.

I am glad to see that the consideration of "critical temperatures" of *quasi*-solids (the importance of which was emphasised in my little work on metamorphism some fifteen years ago) is receiving serious attention, and I may also point out that the idea of a potentially liquid (or even gaseous) condition of a mass at depths in a practically rigid state is not new; it was treated in a masterly way by Prof. Albert Heim, of Zürich, some twenty years ago, in his magnificent work "Ueber den Mechanismus der Gebirgsbildung." "Ueberlastet" is the word used by Heim to express such conditions, where the pressure is so far "hydrostatic" as to consist of compression acting equally (for the time being) in all directions. Any disturbance in a given portion of the lithosphere of the equilibrium thus existing must result in *shearing movement* if the disturbance be small, and in *flow* in a given direction if the relief in that direction from pressure is great and rapid enough. In the former case we should get "metataxic change," in the latter schistosity; for I still challenge the statement, made recently by a high authority, that "it is only a question of degree between the cleavage of a slate and the foliation of a crystalline schist or gneiss."

Questions relating to tidal action in the rotating lithosphere, and even Lord Kelvin's oft-repeated objection on that ground to the impossibility of any considerable portion of the lithosphere being fluid, because the earth does not undergo the deformation which the physicist would expect owing to the tidal action which should be set up within it, might possibly be seen in a fresh light on taking into account the remarkable facts demonstrated by Prof. John Perry in his lecture on spinning tops, which he gave to an audience of working men on the occasion of the meeting of the British Association at Leeds in 1890. As a "working man" in a real sense of the word, I considered myself privileged to attend that lecture, and was rewarded by finding in my own mind a great difficulty cleared up by Prof. Perry's masterly demonstrations of the practically rigid condition of non-rigid bodies, if only made to rotate with sufficient rapidity, as the equatorial regions of the earth do—something like 1000 miles an hour.

Bishop's Stortford, April 17. A. Irving.

Rival Parents.

A curious example of the rival claims of a pair of thrushes and a pair of blackbirds for the parentage of a young blackbird is being observed in my garden.

A pair of blackbirds built a nest in a small thick laurel, and in another shrub, some 4 feet off, a pair of thrushes also built a nest. The young in both nests were hatched out at the same time, and were successfully reared until they were some eight or nine days old, when a cat attacked the nests (Monday, April 17), killing all the young thrushes and all the blackbirds except one, which was found hidden under the shrubs. It was continually visited after the tragedy by both the old thrushes and old blackbirds, and two or three hours later was removed in some way not observed to a shrubbery twenty or thirty yards away. There for the last five days it has been fed and looked after by both pairs of birds, who mob with exceptional vigour any intruding cat or dog. The young bird seems to have thriven mightily under the attentions of its true and foster parents, who appear in no way to be jealous of one another.

Kennedy J. P. Orton.

University College of North Wales, Bangor, April 21.

The Measurement of Mass.

In the notice of my little book, "Radium Explained," on April 6, twenty-nine lines are devoted to showing that I have reached a wrong conclusion through not knowing that mass is measured by inertia, and I am corrected in these words:—"how is the quantity of matter to be ascertained? The choice practically lies between defining mass by inertia at a given speed or by gravity. . . . As, however, gravity depends on local circumstances, while inertia (at given velocity) does not, the latter property is preferred for the definition of mass, as being more fundamental." So far from rejecting this principle, I state it, in almost the same terms, on p. 84 of my book:—"Mass, or quantity of matter, is usually ascertained by weighing. But weight is merely the force with which the earth attracts, and this varies with our position on its surface. To get an absolute test of mass, which would be independent of position, we may measure the force required to move or stop a body at a certain speed." And nowhere in the book have I supported any argument by the repudiation of the principle here clearly stated. This is a question of fact; the other objection taken is equally ill-founded, but, being on a controversial point, it cannot be dealt with so briefly.

W. Hampson.

West Ealing, May 1.

Properties of Rotating Bodies.

Prof. W. H. Pickering, in Nature of April 27 (p. 608), refers to the property which a rotating body possesses of assimilating, in certain circumstances, its axis of rotation to a secondary axis of rotation or revolution impressed upon it, and he mentions the fact that this property is rarely described.

It was fully discussed in an elementary lecture given by Prof. Perry at the Royal Institution about fifteen years ago, and afterwards published in the Romance of Science Series under the title "Spinning Tops."

E. W. Rowntree.

20 Queen Square, W.C., May 1.

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[1] Report Brit. Assoc., 1896, p. 983; and *Proc. Birmingham Nat. Hist. and Philos. Soc.*, 1899.

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